

Cultural Identity and Technological Literacy as Dual Drivers: The Impact of Zhanjiang Nianli Digital Dissemination on the International Competence of Corporate Tech Talents

Hanjuan Tang

School of Foreign Languages, Lingnan Normal University, Zhanjiang, Guangdong, China

Abstract: Amid globalization and China's "Dual Creation" initiative, fostering internationally competent tech talents has become a strategic priority for second-tier cities such as Zhanjiang. This study explores how cultural identity and technological literacy interact to enhance such competence, taking Zhanjiang's intangible heritage-the "Nianli" festival-as a focal point. We propose that strong local cultural identity, combined with technological proficiency, creates a "dual-driver" effect that boosts professionals' global readiness. Using a mixed-methods design, we first distributed questionnaires to 250 tech professionals in Zhanjiang to assess correlations among cultural identity, English reading skills, and tech adoption. Subsequently, a quasi-experimental intervention was conducted, wherein an AI-driven intelligent tutoring system (ITS) provided metacognitive reading strategy training integrated with English digital content on Nianli culture (e.g., VR, interactive stories). A control group used conventional English materials. Results showed that the experimental group achieved significant gains not only in reading comprehension and metacognitive awareness but also in cultural confidence and cross-cultural efficacy. This indicates that digitally embedding local culture into skill training enriches learning and strengthens international competence. We propose a "Cultural-Tech Literacy Integration Model," positing that enabling tech talents to digitally articulate local heritage in global languages effectively transforms culture into human capital-aligning with "Dual Creation" goals.

Keywords: International Competence; Cultural Identity; Technological Literacy; Digital Dissemination; Nianli Festival; Intelligent Tutoring System; Metacognitive

Training; Dual Creation; Zhanjiang; Corporate Tech Talents

1. Introduction

The rapid integration of the Chinese economy into the global framework has placed unprecedented demands on its workforce, particularly in the technology sector. For second-tier cities and regional hubs like Zhanjiang, a major port city in Guangdong Province, this presents both a challenge and an opportunity. The challenge lies in cultivating a cohort of corporate tech talents who are not only technically proficient but also possess the international competence to collaborate, innovate, and compete on a global stage. International competence encompasses more than just foreign language ability; it includes cross-cultural communication skills, global awareness, adaptability, and a sense of professional identity that can navigate diverse cultural contexts [1]. For tech professionals, this competence is crucial for understanding global project requirements, collaborating in international teams, and effectively communicating with clients and stakeholders worldwide.

Simultaneously, China is vigorously promoting the "Dual Creation" (Shuang Chuang) policy---the creative transformation and innovative development of traditional Chinese culture. This policy urges the revitalization of cultural heritage like Zhanjiang's Nianli Festival, a vibrant, community-based annual celebration with deep historical roots, through modern and innovative means. Traditionally, the focus of cultural preservation and that of corporate talent development have existed in separate silos. This study proposes a novel integration: leveraging the digital dissemination of local culture as a vehicle for enhancing the international competence of tech professionals.

The core research problem addresses a critical

gap: how can the seemingly disparate goals of cultural heritage propagation and corporate technical upskilling be synergized? We hypothesize that cultural identity and technological literacy act as "dual drivers" in this process. A strong, digitally-native understanding of one's own culture (e.g., Nianli) provides the foundational confidence and unique perspective needed for meaningful global engagement. Meanwhile, technological literacy, particularly through tools like AI-driven Intelligent Tutoring Systems (ITS) with embedded metacognitive training, provides the methodological means to efficiently acquire the necessary skills, such as professional English reading comprehension.

This paper, therefore, seeks to answer the following research questions:

What is the correlation between Zhanjiang tech talents' identification with Nianli culture, their English reading proficiency, and their receptiveness to technology-enhanced learning? How can an ITS, incorporating metacognitive strategies and Nianli-themed digital content, be effectively designed to simultaneously enhance cultural understanding and English reading ability?

What is the measurable impact of such an integrated intervention on the participants' self-assessed and demonstrated international competence?

How do cultural identity and technological literacy interact as "dual drivers" in this process?

By merging the objectives of the Zhanjiang Nianli cultural dissemination project and the tech talent English upskilling project, this research aims to provide a replicable model for regional development, demonstrating that cultural confidence and technological prowess are not mutually exclusive but are, in fact, mutually reinforcing drivers of global success.

2. Literature Review

2.1 International Competence and Its Components for Tech Talents

International competence represents a sophisticated, multi-dimensional construct that extends far beyond basic linguistic proficiency in today's interconnected global economy. For corporate tech talents operating in cross-border environments, this competence encompasses a complex integration of capabilities that enable

effective professional functioning across cultural and geographical boundaries. The framework of international competence can be comprehensively understood through three fundamental dimensions that collectively define a globally competent tech professional.

Professional Communication stands as the foundational layer of international competence, involving much more than simple language translation. This dimension requires the ability to comprehend complex technical documentation, interpret nuanced project specifications, produce clearly articulated reports, and engage in sophisticated technical discussions within international contexts [2]. What distinguishes this level of communication is the capacity to convey technical concepts with precision while adapting communication styles to suit diverse international audiences. For instance, a developer in Zhanjiang must be able to explain software architecture to colleagues in Germany while simultaneously documenting system requirements for stakeholders in Japan, demonstrating remarkable linguistic flexibility and technical clarity.

Cross-cultural awareness constitutes the second crucial dimension, demanding a profound understanding of how cultural nuances influence professional interactions in global technology environments. This extends beyond superficial cultural knowledge to encompass deep appreciation of how cultural factors affect international teamwork dynamics, negotiation approaches, and project management methodologies [3]. Tech professionals with well-developed cross-cultural awareness can navigate differences in communication styles, decision-making processes, and conflict resolution approaches across cultures. They understand how hierarchical structures, relationship-building practices, and time management expectations vary across different cultural contexts, enabling them to build stronger international collaborations and prevent misunderstandings that could derail global projects.

Global mindset represents the overarching cognitive orientation that completes the triad of international competence. This dimension involves cultivating genuine curiosity about and appreciation for global technological trends, international market dynamics, and diverse approaches to problem-solving and innovation

[4]. Professionals with a global mindset actively seek to understand how technological developments in one region might impact global markets, and they demonstrate openness to incorporating diverse perspectives into their work. This mindset enables them to anticipate emerging global opportunities, adapt technologies for different international contexts, and contribute meaningfully to their organization's global strategy.

The absence of proficiency in any of these interconnected areas can significantly impede a tech professional's effectiveness within multinational corporations or global supply chains. For technology hubs like Zhanjiang, where industries such as port logistics and aquatic product trade are deeply integrated into international networks, deficiencies in these competencies can create substantial barriers to global competitiveness and innovation. Therefore, systematically developing these three dimensions of international competence becomes not merely beneficial but essential for both individual career advancement and regional economic development in the global technology landscape.

2.2 Cultural Identity as a Foundation for Global Engagement

Contrary to the persistent notion that local culture represents a barrier to globalization, contemporary scholarship in intercultural studies strongly posits that a strong, secure cultural identity serves as a fundamental prerequisite for effective and meaningful cross-cultural interaction [5]. This counterintuitive relationship can be powerfully understood through the theoretical lens of Social Identity Theory [6], which demonstrates that a positive, well-defined in-group identity provides the essential psychological security and self-assurance required to openly and constructively engage with out-groups. When individuals possess a deep, nuanced understanding and genuine appreciation of their own cultural background, they maintain a psychological "anchor" that provides stable self-confidence and a clear frame of reference for interpreting and navigating cultural differences. This foundational security allows them to approach other cultures from a position of strength and curiosity rather than insecurity or defensiveness, thereby significantly reducing intercultural anxiety and fostering more

authentic, effective communication.

Furthermore, a robust cultural identity can be strategically viewed as a valuable form of "cultural capital" [7] in the global arena. This capital enriches professional and social interactions by providing a unique, distinctive standpoint in global dialogues, enabling individuals to contribute perspectives that transcend homogenized global narratives. China's "Dual Creation" policy provides a coherent strategic framework for operationalizing this principle, systematically transforming traditional cultural heritage like the Nianli festival from a static historical relic into a dynamic, living resource for contemporary identity formation. Digital dissemination-through immersive social media campaigns, virtual reality experiences, sophisticated gamification, and interactive digital storytelling-serves as the primary mechanism for this creative transformation. These technologies make intangible cultural heritage profoundly accessible, personally relevant, and deeply engaging for the younger, tech-savvy generations who will shape future global interactions, effectively bridging the gap between traditional cultural depth and modern global engagement.

2.3 Intelligent Tutoring Systems and Metacognitive Training in Language Acquisition

Intelligent tutoring systems (ITS) represent a sophisticated class of computer-based learning platforms that deliver immediate, personalized instruction and feedback to learners without requiring constant human intervention [8]. Their effectiveness in facilitating knowledge and skill acquisition across diverse domains is well-established in educational research. When specifically applied to the complex domain of language learning, ITS platforms demonstrate remarkable adaptability by dynamically adjusting to individual learners' paces, precisely identifying unique knowledge gaps through continuous assessment, and generating tailored exercises that target specific areas needing improvement. This personalized approach moves beyond one-size-fits-all methodology to create optimized learning pathways for each user.

A distinguishing feature of advanced ITS is their capacity to systematically train metacognition-the crucial cognitive process of

"thinking about one's thinking" that enables learners to monitor and regulate their own learning processes. In the specific context of reading comprehension, metacognitive strategies encompass three vital phases: strategic planning before reading (such as previewing texts and setting reading goals), active monitoring during reading (checking for understanding and implementing fix-up strategies when comprehension falters), and thorough evaluation after reading (assessing overall comprehension and reflecting on strategy effectiveness) [9]. Substantial research evidence confirms that explicit, structured metacognitive training significantly enhances reading comprehension outcomes, particularly in second language acquisition contexts, as it effectively transforms learners from passive recipients of information into self-regulated, strategic readers who can independently navigate complex texts [10].

The architecture of modern ITS provides an ideal technological framework for embedding metacognitive prompts, guided reflections, and interactive strategy tutorials directly into the learning experience. However, despite this significant potential, the strategic integration of such systematic metacognitive training with highly specific, culturally-contextualized authentic content remains a notably under-explored research area with substantial potential for enhancing both learner engagement and pedagogical efficacy. This integration represents a promising frontier where digital education technology can bridge cultural learning with cognitive skill development, creating more meaningful and effective language learning experiences that prepare learners for real-world cross-cultural communication.

2.4 The Research Gap: Integrating the Threads

While the distinct domains of international competence, cultural identity, Intelligent Tutoring Systems (ITS), and metacognition have each been substantively investigated within their respective academic silos, a conspicuous and critical gap persists in the scholarly literature: the lack of integrative research that strategically converges these elements into a unified, coherent framework. Existing studies have typically examined these variables in isolation, exploring, for instance,

the general impact of ITS on language acquisition or the theoretical relationship between cultural identity and global mindset, without conceptualizing their synergistic potential. This fragmented approach has limited our understanding of how technological innovation can be leveraged to simultaneously foster both the cultural confidence and professional communication skills essential for global effectiveness. Specifically, no existing empirical study has proposed or implemented a methodology that utilizes the digital content of a specific, local cultural heritage item-such as the Zhanjiang Nianli festival-as the core pedagogical material within an AI-driven ITS, with the explicit dual objective of enhancing cultural identity and a key component of international competence, namely professional English reading.

This research directly addresses this significant gap by creating, implementing, and rigorously testing a novel holistic intervention. The proposed model moves beyond treating cultural knowledge and global communication skills as separate educational goals. Instead, it conceptualizes them as two deeply intertwined and mutually reinforcing sides of the same coin in the development of a globally competent professional. By embedding culturally rich, authentic content into a technologically advanced learning platform that also trains essential metacognitive strategies, this study seeks to demonstrate a new pathway for talent development-one that empowers individuals not merely as skilled technicians, but as culturally grounded, confident, and articulate global actors.

3. Methodology

This study adopted a sequential explanatory mixed-methods design, beginning with a quantitative phase followed by a qualitative phase to provide depth and context to the numerical results.

3.1 Phase 1: Quantitative Correlation Study

Participants: 250 tech professionals from various industries in Zhanjiang (e.g., Zhanjiang Port Group, marine biotechnology firms, IT companies) were recruited via stratified random sampling. Table 1 summarizes the demographic characteristics of the participants.

Cultural Identity Scale: A 20-item Likert scale adapted from existing scales [11] Multigroup

Ethnic Identity Measure), measuring participants' knowledge, emotional attachment, and participatory behavior regarding the Nianli festival. The scale demonstrated high internal consistency in this study (Cronbach's $\alpha = .89$).
 English Reading Proficiency Test: A standardized test focusing on technical and semi-technical passages relevant to their fields.
 Technology Adoption and Metacognitive Awareness Questionnaire: Assessing their comfort with digital learning tools and their typical use of reading strategies. The metacognitive awareness sub-scale showed good reliability (Cronbach's $\alpha = .84$).

Table 1. Participant Demographics (N=250)

Demographic Characteristic	Categories	Percentage (%)
Industry	Port Logistics	28%
	IT & Software	35%
	Marine Bio-Tech	22%
	Others	15%
Position	R&D Engineer	40%
	Project Manager	25%
	Technical Support	20%
	Other	15%
Work Experience	< 5 years	30%
	5 - 10 years	45%
	> 10 years	25%

Data Analysis: Pearson correlation coefficients (with effect sizes) and multiple regression analyses were conducted using SPSS to examine the relationships between the variables.

3.2 Phase 2: Quasi-Experimental Intervention

Participants: 60 volunteers from the initial 250 were selected and randomly assigned to an Experimental Group (EG, $n=30$) and a Control Group (CG, $n=30$). The groups were matched for initial English proficiency.

Intervention design:

Control Group: Received 8 weeks of standard English reading comprehension training using generic technical texts and traditional teaching methods. Both groups received the same total amount of training hours (24 hours over 8 weeks) and had no additional teacher intervention during the study period.

Experimental Group: Received 8 weeks of training using the custom-built ITS, "Nianli-ITS."

The Nianli-ITS System was developed with two

core modules. See Figure 1 for a schematic representation of the system architecture):

The ITS provided adaptive feedback, suggesting specific metacognitive strategies based on user error patterns. This adaptivity was achieved through a rule-based algorithm that categorized common error types (e.g., pronoun reference, logical connector misunderstanding) and mapped them to pre-defined strategy prompts, allowing for immediate, personalized guidance.

Cultural content module:

Videos of festival processions, interviews with community elders (with English subtitles), and explainer articles on its symbolic rituals.

A knowledge graph linking Nianli concepts (e.g., "community cohesion," "ancestral worship") to universal cultural themes.

Metacognitive reading tutor module:

Pre-reading: The ITS would prompt users to plan by activating prior knowledge about the upcoming Nianli-themed text ("What do you already know about the Lion Dance in Nianli?").
 During-reading: It embedded tools for monitoring, such as a digital highlighter for difficult words/concepts, with linked glossaries and contextual pop-up questions to check comprehension.

Post-reading: It prompted evaluation through reflective questions ("What was the main idea? What strategy helped you most?") and quizzes that tested both reading comprehension and cultural understanding.

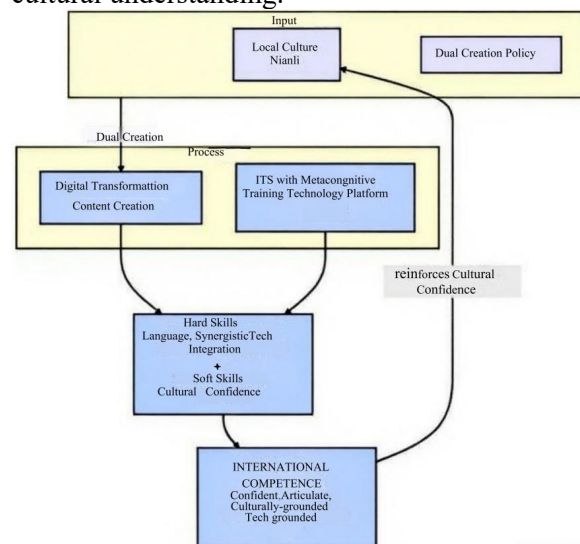


Figure 1. The Cultural-Tech Literacy Integration Model

The ITS provided adaptive feedback, suggesting specific metacognitive strategies based on user errors (e.g., "It seems you struggled with the pronoun references in this paragraph. Try

'tracking pronouns' as a strategy next time.").

Data collection and analysis:

Pre-test and Post-test: Both groups took the same English Reading Proficiency Test and Cultural Identity Scale before and after the intervention.

Semi-structured Interviews: Post-intervention, 15 participants from the EG were interviewed to gather qualitative data on their experiences, changes in cultural perception, and self-efficacy in cross-cultural situations.

ITS log data: System interactions (time on task, strategy usage, error patterns) were analyzed to understand learning behaviors.

Quantitative data was analyzed using ANCOVA to compare post-test scores while controlling for pre-test scores. Qualitative interview data was transcribed and subjected to thematic analysis.

4. Results and Findings

4.1 Phase 1: Correlational Evidence for the "Dual Drivers"

The initial quantitative survey yielded compelling evidence supporting the fundamental premises of the "dual-driver" hypothesis. Statistical analysis revealed a statistically significant, moderate positive correlation between Cultural Identity scores and English Reading Proficiency ($r = 0.42$, $p < .01$), indicating that individuals with a stronger sense of cultural attachment and understanding of the Nianli festival tended to demonstrate higher levels of English reading comprehension. This relationship, demonstrating a medium effect size, suggests that cultural identity may provide a motivational and contextual foundation that facilitates second language acquisition. More notably, a stronger and more robust positive correlation was identified between Technology Adoption scores and Metacognitive Awareness ($r = 0.58$, $p < .01$, representing a large effect size). This compelling finding implies that tech professionals who are more comfortable and proficient with using digital tools are also more likely to employ strategic, self-regulatory learning processes, such as planning, monitoring, and evaluating their comprehension.

To further investigate the combined predictive power of these factors, a multiple regression analysis was conducted. The results confirmed that both Cultural Identity and the composite factor of Technological Literacy/Metacognitive Awareness were statistically significant and

independent predictors of English Reading Proficiency. Crucially, these two drivers together accounted for a substantial 38% of the total variance ($R^2 = .38$) in reading proficiency scores. This provides robust preliminary evidence that cultural and technological factors do not operate in isolation but function synergistically. The findings substantiate the core argument that a secure cultural identity and advanced technological literacy act as complementary forces, collectively forming a "dual-driver" mechanism that significantly contributes to the development of a key component of international competence. This established a solid empirical foundation for proceeding to the experimental intervention phase.

4.2 Phase 2: Impact of the Integrated Intervention

Quantitative results:

English Reading Proficiency: The ANCOVA revealed a statistically significant difference between the EG and CG on the post-test reading scores, $F(1, 57) = 22.15$, $p < .001$, with the EG ($M_{adj} = 82.5$) outperforming the CG ($M_{adj} = 75.2$).

Cultural Identity: Similarly, a significant difference was found in the Cultural Identity post-test scores, $F(1, 57) = 15.87$, $p < .001$, with the EG ($M_{adj} = 4.5$ on a 5-point scale) showing a greater increase than the CG ($M_{adj} = 3.9$).

Metacognitive Awareness: A self-reported metacognitive awareness survey showed the EG demonstrated significantly greater improvement in the use of planning, monitoring, and evaluating strategies post-intervention.

Qualitative results:

Thematic analysis of the interviews yielded four key themes that explained the quantitative outcomes:

From Ambiguity to Articulation: Participants consistently reported a transformative shift in their ability to discuss local culture with international colleagues. The intervention, by teaching about the Nianli festival in English, equipped them with the precise vocabulary and conceptual framework they had previously lacked. This moved them from vague, superficial descriptions to nuanced and meaningful explanations. As one participant articulated, "Before, if a foreign client asked about our local traditions, I would default to a simple, almost dismissive phrase like, 'it's a big

party.' Now, I can confidently explain the symbolism behind the ceremonial offerings and convey the profound sense of community the festival fosters." This transition from ambiguity to articulate expression was reported to significantly enrich professional dialogues, moving them beyond transactional exchanges to deeper, more relational connections. The ability to act as a cultural interpreter for their own heritage was a key outcome, enhancing their role in cross-cultural teams.

Enhanced Engagement and Motivation: The Nianli-themed digital content was overwhelmingly cited as significantly more engaging and meaningful compared to conventional technical reading materials. This alignment with learners' personal cultural backgrounds created a powerful emotional and intellectual connection that generic texts failed to establish. As one participant elaborated, "Reading technical specifications about a circuit board is abstract and monotonous. In contrast, navigating an English narrative about the intricate community preparations for Nianli, followed by answering probing questions, felt immediately relevant and personally interesting." This heightened personal relevance directly translated into increased motivation, with participants demonstrating greater willingness to engage with complex vocabulary and persist through challenging passages. The intrinsic interest in the cultural subject matter effectively transformed the learning process from a routine task into an exploratory and enjoyable endeavor, thereby fostering deeper cognitive engagement and sustained effort.

The metacognitive "scaffold": participants consistently emphasized the value of the structured cognitive support provided by the ITS, which served as an essential metacognitive framework throughout their learning process. The system's carefully designed prompts effectively interrupted their habitual reading patterns, compelling them to pause and consciously engage with their own comprehension strategies. As one user explained, "When the system prompted me with 'What is your reading goal?' before I began, it fundamentally shifted my approach-I stopped just diving in and instead started with purpose. The strategically placed pop-up questions during reading acted as regular checkpoints, preventing mindless skimming and ensuring I was truly processing the material." This external

scaffolding successfully cultivated more self-regulated reading behaviors, as learners internalized these metacognitive questions and began applying them independently. The intervention thus served not only to improve immediate comprehension but to instill transferrable critical reading habits that extended beyond the specific learning context, demonstrating the powerful role of guided metacognitive development in professional upskilling.

Boost in cross-cultural confidence: the most prominent finding was participants' marked increase in self-assuredness in international settings. By mastering the vocabulary to articulate their cultural heritage, they transformed what was once an ambiguous aspect of their identity into a "unique cultural story" to share. This newfound articulateness significantly reduced their anxiety about cross-cultural interactions. Their professional identity evolved from a generic "Chinese engineer" to a more distinctive "engineer from Zhanjiang with a rich cultural background," fostering a more balanced, confident, and grounded sense of self in the global professional arena.

5. Discussion

5.1 Synergistic Drivers: The Convergence of Quantitative and Qualitative Evidence

The integrated results from both the quantitative and qualitative phases of this study provide compelling evidence that strongly supports the central thesis of this research: cultural identity and technological literacy do not merely coexist but function as powerful, synergistic drivers in building comprehensive international competence among corporate tech talents. The converging findings from both methodological approaches paint a coherent picture of how this dynamic interaction operates in practice, offering valuable insights into the underlying mechanisms that facilitate professional development in global contexts.

5.2 The Dual Mechanism: Contextualized Learning Augmented by Metacognitive Scaffolding

The statistically significant improvement in the Experimental Group's English reading proficiency can be substantially attributed to the meaningful, culturally-grounded context

provided by the Nianli-themed content. This finding aligns robustly with Cognitive Load Theory [12], which posits that learning complex new material becomes more efficient when embedded within a familiar and coherent contextual framework that reduces extraneous cognitive load. For the Zhanjiang participants, the Nianli narratives served as a familiar semantic and cultural scaffold upon which they could more readily build new linguistic knowledge, thereby making the acquisition of complex English structures and professional vocabulary more efficient and sustainable. This phenomenon further resonates with the principles of Situated Learning theory [13], which emphasizes that knowledge is most effectively acquired and retained when learning contexts authentically reflect the situations in which that knowledge will be applied.

This contextual advantage was powerfully augmented by the systematic metacognitive training embedded within the ITS, which equipped learners with transferable strategies to deconstruct any complex text. The metacognitive scaffolding-through planning prompts, monitoring checks, and evaluation reflections-transformed participants from passive readers into active, strategic processors of information. This dual approach of contextual familiarity and strategic empowerment created optimal conditions for professional language acquisition that extends beyond the immediate learning context.

5.3 Reciprocal Reinforcement: Cultural Identity and the "Dual Creation" Policy

Furthermore, the observed dual improvement in both cultural identity and professional competence represents a critical finding with profound implications. It convincingly demonstrates that China's "Dual Creation" process is not a unidirectional extraction from cultural resource to economic product, but rather a dynamic, reciprocal relationship. The active process of digitally engaging with one's own cultural heritage through a global language and contemporary technological medium actively reconstructs, reinforces, and revalues one's connection to that heritage within a modern professional context.

This transformative process can be effectively framed through the lens of Self-Determination Theory [14], as it simultaneously satisfies multiple fundamental psychological needs: the

need for relatedness (through connection to cultural community), competence (through mastery of both technological tools and language skills), and autonomy (through self-directed learning within the ITS environment). Participants were not passive recipients of cultural knowledge but active agents using advanced digital tools to re-interpret, re-articulate, and re-value their heritage. This engagement fostered a modern, confident, and exportable form of cultural identity-precisely the combination needed for effective global engagement in today's knowledge economy.

5.4 The Cultural-Tech Literacy Integration Model: A Sustainable Framework

These empirical and theoretical insights culminate in the proposed "Cultural-Tech Literacy Integration Model" (see Figure 1), which synthesizes these complex interactions into a coherent framework for talent development. The model illustrates a virtuous cycle wherein:

1. Local cultural heritage (Nianli) undergoes systematic digital transformation through the "Dual Creation" process into engaging, pedagogically sound learning content.
2. This enriched content is delivered via an adaptive technological platform (ITS) that explicitly trains higher-order cognitive skills (metacognition) alongside professional language capabilities.
3. Learners consequently emerge with enhanced Hard Skills (e.g., Professional English proficiency) and reinforced Soft Skills (e.g., Cultural Confidence, strategic thinking).
4. These integrated capabilities culminate in demonstrable International Competence, empowering professionals to operate as confident, culturally-grounded global actors.
5. This professional success further reinforces cultural identity and technological engagement, creating a positive feedback loop that sustains continuous development.

This integrated model moves substantially beyond traditional siloed approaches, presenting instead a holistic, sustainable framework for talent development in our globalized, digital era-one that strategically leverages cultural resources as assets rather than treating them as separate from professional development. It offers a replicable blueprint for regions worldwide seeking to cultivate globally

competitive talents while preserving and revitalizing their unique cultural heritage.

6. Conclusion and Implications

6.1 Conclusion

This study successfully demonstrates that the digital dissemination of Zhanjiang's Nianli culture, when strategically integrated with an AI-driven intelligent tutoring system for metacognitive English reading training, can significantly enhance the international competence of local corporate tech talents. The research provides empirical evidence that cultural identity and technological literacy are not competing priorities but are "dual drivers" that, when combined, produce a more profound and effective learning outcome than either could alone. It validates the "Dual Creation" policy as not merely a cultural directive but a potent strategy for human resource development, effectively bridging cultural confidence with technological prowess.

6.2 Theoretical and Practical Implications

Theoretical: This research contributes to a nascent theoretical framework that bridges cultural studies, educational technology, and international business. It introduces the "Cultural-Tech Literacy Integration Model" as a new paradigm for understanding competence development in a globalized world.

Practical:

For enterprises: Companies, especially in emerging regions, should invest in integrated training programs that combine technical language skills with local cultural education to build a more confident and effective global workforce.

For policymakers: Projects aimed at cultural preservation and those aimed at talent development should be designed with synergy in mind. Funding could be directed towards creating high-quality, multilingual digital archives of local culture that can be repurposed for educational technology.

For educators/trainers: The design principles of the Nianli-ITS---contextualized content, embedded metacognitive support, and adaptive feedback---can be applied to various other domains to create more engaging and effective learning experiences.

6.3 Limitations and Future Research

While this study provides valuable insights, several limitations should be acknowledged. The sample size, though statistically adequate, was confined to a single urban context, which may affect the generalizability of findings across different regional settings with varying cultural dynamics. The intervention period of 8 weeks, while intensive, represents a relatively short timeframe for assessing the long-term development of international competence. Additionally, the potential influence of the Hawthorne Effect cannot be entirely discounted, as participants in the experimental group were aware of their involvement in an innovative training program, potentially affecting their performance and responses.

These limitations illuminate several promising avenues for future research. First, longitudinal studies tracking participants over 12-24 months would help determine whether the observed gains in cultural confidence and professional competence are sustained and continue to develop beyond the immediate intervention period. Second, replicating this study in other regional contexts with different cultural heritage elements would test the model's adaptability and identify potential contextual factors influencing its effectiveness. Third, emerging technologies like AI-Generated Content (AIGC) present exciting opportunities to create dynamic, personalized cultural narratives within intelligent tutoring systems, potentially enhancing both engagement and learning outcomes.

Furthermore, research should investigate the model's tangible impact on workplace performance metrics, including success in international projects, cross-cultural team collaboration effectiveness, and client satisfaction rates. Finally, examining how individual differences---such as pre-existing cultural intelligence (CQ), personality traits like openness to experience, or technological self-efficacy---moderate the intervention's effectiveness would provide deeper understanding of for whom and under what conditions this approach works best.

In conclusion, this research demonstrates that for Zhanjiang and countless developing regions worldwide, achieving global relevance requires neither cultural assimilation nor technological adoption in isolation. Rather, the path forward lies in strategically empowering local populations to wield their unique cultural

heritage with confidence, articulating it to the world through the powerful, complementary tools of technology and language. This integration of cultural grounding with global communication capabilities represents the essence of authentic, sustainable international competence in the 21st century.

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